"More efficient steers on good diets are not the most efficient ones on limiting diets"

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Summary

As nutrition represents the major operative cost in beef cattle production, small improvements on feed efficiency (FE) may lead to significant economic benefits and parallelly, reduce its environmental footprint. Usually, animals are selected on high-protein (HP) diets and are expected to perform as efficient on low-protein (LP) diets. This experiment used 30 *Bos indicus* steers (398 ± 24 kg BW) with the objective of demonstrating whether FE in a HP diet is correlated to FE in a LP diet. The hypothesis suggested that there would be a strong correlation between diets. Steers were fed for two periods of 70 days, supplying either 100% or 70% of their rumen degradable protein requirements. Traits studied were average daily gain (ADG), dry matter intake (DMI), feed conversion ratio (FCR) and residual feed intake (RFI). In the LP diet, ADG was 0.93 kg/d (0.38 to 1.47), DMI averaged 9.67 kg/d (7.9 to 12.1), FCR averaged 11.14 kg/kg (6.6 to 27.8), and RFI varied from -1.55 to 1.84. In the HP diet, ADG was 1.16 kg/d (0.77 to 1.56), DMI was 9.87 kg/d (4.79 to 11.87), FCR was 8.73 kg/kg (5.3 to 12.4), and RFI varied from -2.53 to 1.61. There was no correlation for FCR (P = 0.71; R^2 = 0.005) nor for RFI (P = 0.08; R^2 = 0.11) between both diets. These results suggest that different physiological mechanisms are responsible for FE regulation in both diets; thus, standard diets should not be used when targeting performance in low-protein diets.